Foskett Speckled Dace
(Rhinichthys osculus ssp.)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Oregon Fish and Wildlife Office
Portland, Oregon

5-YEAR REVIEW

Species reviewed: Foskett Speckled Dace (*Rhinichthys osculus ssp.*)

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1.0 GENERAL INFORMATION

1.1 Reviewers:

Lead Regional Office:
Region 1 Endangered Species Branch, Sarah Hall, (503) 231-2071

Lead Field Office:
Oregon Fish and Wildlife Office - Bend Field Office
Alan Mauer (541) 383-7146
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Cooperating Field Office(s):
Not applicable

Cooperating Regional Office(s):
Not applicable

1.2 Methodology used to complete the review:

In order to conduct this 5-year review for the Foskett speckled dace, the U.S. Fish and Wildlife Service (Service) gathered available information since the time of listing: including 2005 and 2007 Progress Reports from the Oregon Department of Fish and Wildlife (ODFW); reviewed activities undertaken since the time of listing to determine if recovery actions have progressed; reviewed new information regarding the status of the threats to the species; reviewed the recovery criteria in the recovery plan; and made recommendations. This review was conducted by Oregon Fish and Wildlife Office's Bend Field Office. The ODFW Assistant Project Leader for the Native Fish Investigation Project reviewed this draft 5-year review.

The notice of initiation of a 5-year review was published in the *Federal Register* on April 11, 2006. This notice requested any information concerning the status of the Foskett speckled dace. No information was received in response to this notice.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

The Service announced the initiation of a 5-year review of 70 species including the Foskett speckled dace under section 4(c)(2)(B) of the Endangered Species Act (Act) in an April 11, 2006, *Federal Register* notice (71 FR 18345).

1.3.2 Listing History:

Original Listing
FR notice: Endangered and threatened wildlife and plants; Determination of threatened status for Hutton tui chub and Foskett speckled dace (50 FR 12302).
Date listed: September 27, 1985
Entity listed: The sub-species Foskett speckled dace (*Rhinichthys osculus ssp.*)
Classification: Threatened

Revised Listing, if applicable
Not applicable

1.3.3 Associated Rulemakings:

Foskett speckled dace were listed with no critical habitat designated. Foskett speckled dace are included in "Special rules-fishes" in 50 CFR 17.44 (j). The rule has four parts and states:

(1) No person shall take these species, except in accordance with applicable State fish and wildlife conservation laws and regulations in the following instances: for educational purposes, scientific purposes, the enhancement of propagation or survival of the species, zoological exhibition, and other conservation purposes consistent with the Act.

(2) Any violation of applicable State fish and wildlife conservation laws or regulations with respect to the taking of these species will also be a violation of the Endangered Species Act.

(3) No person shall possess, sell, deliver, carry, transport, ship, import, or export, by any means whatsoever, any such species taken in violation of these regulations or in violation of applicable State fish and wildlife conservation laws or regulations.

(4) It is unlawful for any person to attempt to commit, solicit another to commit, or cause to be committed, any offense defined in paragraphs (j) (1) through (3) of this section.

1.3.4 Review History:

This is the first 5-year review for the Foskett speckled dace.

1.3.5 Species' Recovery Priority Number at Start of this 5-Year Review:

The Foskett speckled dace was assigned a recovery priority number of 15. A priority number 15 means the sub-species has a low degree of threat and a high potential for recovery.

1.3.6 Current Recovery Plan or Outline:
Name of plan or outline: "Recovery Plan for the Threatened and Rare Native Fishes of the Warner Basin and Alkali Subbasin" (Recovery Plan).
Date issued: April 27, 1998
Dates of previous revisions, if applicable: Not applicable

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?
__X__ *Yes*
_____ *No*

2.1.2 Is the species under review listed as a DPS?
_____ *Yes*
__X__ *No*

2.1.3 Was the DPS listed prior to 1996?
Not applicable

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?
_____ *Yes*
__X__ *No*

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?
__X__ *Yes*
_____ *No*

The recovery criteria focus on long-term sustainability rather than delisting (See 2.2.3 below for the recovery criteria). The Recovery Plan does not describe specific measurable benchmarks to use to demonstrate progress toward recovery instead it provides conservation criteria and step-down recovery actions.

2.2.2 Adequacy of recovery criteria

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?
__X__ *Yes*
_____ *No*

Although the Recovery Plan was finalized in 1998, little new biological information on the Foskett speckled dace and its habitat has been developed, with the exception of population estimates completed in 1997, 2005, and 2007, and a genetic analysis conducted by the Service's Abernathy Fish Technology Center.

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery?

_X_ *Yes*
___ *No*

2.2.3 List the recovery criteria as they appear in the Recovery Plan, and discuss how each criterion has or has not been met, citing information:

The "Recovery Plan for the Threatened and Rare Native Fishes of the Warner Basin and Alkali Subbasin" provides information to guide recovery for three listed fish species, the Hutton tui chub, Foskett speckled dace, and the Warner sucker (USFWS 1998). The Recovery Plan states: "The Foskett speckled dace and Hutton tui chub will probably not be delisted in the near future because of their extremely isolated ranges and potential for degradation of these habitats from localized events. The primary objective, therefore, is the long-term persistence of these two species through preservation of their native ecosystems." The Recovery Plan also provides objectives and criteria for conserving Foskett speckled dace. The Recovery Plan states that the Foskett speckled dace spring habitat is currently stable, but extremely restricted, and any alterations to the spring or surrounding activities that indirectly modify the spring could lead to the extinction of this species. Due to these circumstances, the Recovery Plan focuses on the long-term persistence of Foskett speckled dace through preservation of its native ecosystem. The recovery criteria for Foskett speckled dace is described in the Recovery Plan as:

> "The conservation and long term sustainability of the Hutton tui chub and the Foskett speckled dace, will be met when:
>
> 1. Long-term protection to their respective habitats, including spring source aquifers, spring pools and outflow channels, and surrounding lands, is assured.
>
> 2. Long-term habitat management guidelines are developed and implemented to ensure the continued persistence of important habitat features and include monitoring of current habitat and investigation for and evaluation of new spring habitats.
>
> 3. Research into life-history, genetics, population trends, habitat use and preference, and other important parameters is conducted to assist in further developing and/or refining criteria 1) and 2), above."

Below we discuss how each of these criteria have, or have not, been met:

Recovery Plan Criterion 1: Criterion 1 has been essentially met for Foskett speckled dace. The Foskett speckled dace exists as a single population within Foskett Spring. In 1987, the Bureau of Land Management (BLM) acquired the 65 hectare parcel of land containing Foskett Spring, and Dace Springs. Dace Springs was the recipient site in an unsuccessful outplant effort in 1979 and 1980 (See section 2.3.1.2). BLM has fenced 28 hectares of the 65 hectare parcel to exclude cattle from both springs. The BLM fence does not include the entire occupied habitat for Foskett speckled dace (See section 2.3.2.1). Little information is available regarding stream flows or the status of the aquifer.

Recovery Plan Criterion 1 addresses threat factor one "Present or threatened destruction, modification or curtailment of its habitat or range" (See discussion under 2.3.2.1 five factor analysis" below).

Recovery Plan Criterion 2: No long-term habitat management guidelines have been developed to ensure long-term persistence. The BLM manages Foskett and Dace Springs lands consistent with the Lakeview Resource Management Plan (RMP) (BLM 2003). The RMP provides general management direction for Special Status Species, and states that they will manage the Foskett speckled dace consistent with the current Recovery Plan. Current management by BLM consists of livestock exclusion (BLM 2003). Monitoring by BLM is limited to periodic inspection of the habitat, and photo point and vegetation sampling. The last site monitoring by BLM was approximately 10 year ago (Alan. Munhall pers. comm. 2007). In 2005 and 2007 the ODFW conducted an investigation to determine the status of the Foskett speckled dace population and site monitoring included measurements of open water, vegetated surface area, water depth, and water temperature, and photos of shoreline conditions. Foskett Spring is field checked several times a year by the ODFW district biologist to determine if obvious problems exist and to check for presence of dace.

In the 2005 and 2007 Progress Reports for the Foskett Spring speckled dace, the ODFW recommended monitoring Foskett speckled dace and its habitat to track fluctuations in population abundance and quantity and quality of available habitat as part of a long-term management program (Scheerer and Jacobs 2005, Scheerer and Jacobs 2007). Additional research into life-history, habitat use, and habitat preference has not been completed. The development of management guidelines would benefit from this type of research.

Recovery Plan Criterion 3: This criterion has been partially met through population surveys by ODFW and the Service, and limited investigation into the genetic relatedness of Foskett speckled dace in comparison with other nearby dace species (See section 2.3.1.3). In 1997, ODFW and the Service contracted for an abundance estimate for Foskett Spring. No subsequent surveys were conducted from 1998 to 2004. In 2005 and 2007, the Service contracted with

ODFW for abundance surveys for the Foskett speckled dace population. Additionally, a sampling protocol was developed that can be used to study the trend of the population. Survey information can be reviewed in section 2.3.1.2. The ODFW recommended studies of key demographic parameters including population age structure, age and size at maturity, longevity, and spawning timing/duration. In addition, research into life history, habitat use and habitat preference would also be beneficial.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information exists on the species biology or life history

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Foskett Spring

Historical data on abundance is limited; Bond (1974) made a visual estimate that there may be 1,500 to 2,000 individual fish at Foskett Spring in 1974. This estimate was not based on sampling of the population. In 1997, the population of Foskett speckled dace was estimated to be 27,787 (95% CI = 14,057-41,516) using a statistically-based sampling procedure (Dambacher et al. 1997). Ninety-seven percent of the total population estimate occurred in a shallow ephemeral open water pool outside of the Foskett Spring exclosure fence. This shallow pool was dry in 1989 (Dambacher et al. 1997).

The Foskett speckled dace population estimate obtained from sampling in August 2005 was 3,147 fish (95% CI = 2,535-3,905) (Scheerer and Jacobs 2005). Over half of the population was located in the spring pool, twenty percent were located in the stream, and smaller proportions (14 percent and 11 percent) were located in the tule marsh and the cattail marsh respectively. Surveys by ODFW in 2007, estimated 2,879 fish (95% CI = 2,319-3,573) (Scheerer and Jacobs 2007). In comparing the estimates from 1997 to 2005 and 2007, by habitat type, the ODFW estimated that there was an increase in the number of Foskett speckled dace inhabiting pool habitat and a decrease in the number inhabiting the stream or marsh type habitat.

Although the three estimates were statistically valid, there is a great discrepancy between the sizes of the population present in 1997 compared to the number that was estimated in 2005; the distribution of the fish was also substantially different. Scheerer and Jacobs (2007) postulated that the lower population abundance in 2005 and 2007 compared to 1997 was probably due to the reduction of open water

habitat in the cattail marsh. Additional population estimates will be needed before a population trend can be established. General observations made during the population surveys of 2005 and 2007 included the presence of multiple age-classes, and evidence of recent recruitment as indicated by presence of young-of-the-year. No additional information is available regarding abundance, population trends, age structure, sex ratio, birth rate, age at mortality, mortality rate, or demographic trends.

Dace Spring

Dace Spring occurs within one mile of Foskett Spring. No Foskett speckled dace were found in a 1970 survey of Dace Spring. An attempt was made to establish an additional population at Dace Spring starting in 1979 and 1980. In each year, 50 fish were removed from Foskett Spring and transplanted into Dace Spring. An estimated 300 fish were present in 1986 (Williams et al. 1990). In 1997, only 19 fish were estimated to remain in Dace Spring (Dambacher et al.1997). Fish observed in Dace Spring were larger than those in Foskett Spring, probably due to the older age classes present and an indication that reproduction at Dace Spring was no longer occurring. The population persisted for at least 17 years; the last observation of fish in Dace Spring was made in 1997.

The loss of Foskett speckled dace from Dace Springs was likely due to the limited area of habitat; the open water filled in with sediment and vegetation, and habitat conditions for reproduction were not adequate. It is suspected that the Dace Spring habitat was not adequate for fish to persist in the long-term. The outflow of Dace Spring terminates in a metal cattle trough. The fish were probably transported with the water flow to the trough, and were unable to return to the spring. It is also believed that reproductive habitat is lacking. The ODFW recommended in their 2005 Progress Report that restoration of Dace Springs and introduction of Foskett speckled dace could reduce the risk of extinction and aid in recovery. No additional attempts to transplant Foskett speckled dace have occurred. The BLM and the Service are working together to construct two ponds near Dace Springs to provide additional habitat. Construction is planned for 2009, and Foskett speckled dace would be transferred to the created habitat once soil and material from the construction activities stabilize and suitable habitat is present.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

In 2003, genetic samples were collected from dace from Foskett Spring, the surrounding Warner Basin, and the adjacent Goose Lake Basin, to analyze the genetic relatedness of Foskett speckled dace in comparison with other nearby dace species. Preliminary genetic information indicates that: "Foskett speckled dace and other populations in the Warner Basin are approximately equally diverged from one another evolutionarily, suggesting similar times of divergence

since the late Pleistocene" (Ardren et al. in lit.). Based on the genetic analysis, Ardren concluded:

1) the magnitude of genetic distances and phylogenetic structuring observed between speckled dace from the Warner Basin and Goose Lake Basin are consistent with patterns usually observed between congeneric species, indicating a deep biogeographical split between these two basins;

2) Speckled dace within the Warner Basin and Foskett Spring appear to be very closely related with a level of genetic divergence among populations and phylogenetic structuring more typical of conspecific populations than congeneric species or subspecies;

3) The pattern of diversity among the four Warner Basin populations is consistent with all populations being of natural origin; and,

4) No evidence was found that Foskett speckled dace are reciprocally monophyletic in respect to the other Warner Basin populations, and nucleotide variations at two mtDNA genes do not justify subspecies status.

Ardren (In lit.) went on to say that his results do not preclude the possibility that other independent genetically based traits that are associated with morphological or life history differences could have occurred within the last 10,000 years. This draft report has not yet been peer reviewed. A systematic assessment of morphological traits and life history of the speckled dace in Warner Basin (Deep, Honey, and Twelvemile Creeks, and Foskett Spring) is needed to determine whether or what subspecies classification is warranted.

2.3.1.4 Taxonomic classification or changes in nomenclature:

At the time of listing, the Foskett speckled dace was considered to be an undescribed subspecies of *Rhinichthys osculus* (Girard) 1857. *R. osculus* (speckled dace) have a large geographic range throughout major drainages in the western United States, and populations show high degrees of endemism and exhibit large differences in morphological traits (Pfrender et al. 2003). Pfrender et al. (2003) stated that our understanding of the relationships among populations in this complex is limited, and there is no clear consensus regarding the number of distinct evolutionary lineages within *R. osculus*. Foskett speckled dace can be distinguished from other speckled dace by external characteristics, such as: a much reduced lateral line with about 15 scales with pores; about 5 lateral line scales; a large eye; the dorsal fin is positioned well behind the pelvic fin but before the beginning of the anal fin; and barbells are present on most individuals (Carl Bond, Oregon State University, pers. comm. 1990; cited in USFWS 1998). However, Bond did not provide a formal description or a scientific name for this

subspecies, nor was his work peer reviewed. No changes to the taxonomic classification of Foskett speckled dace has occurred since the time it was listed in 1985. Recent genetic investigations by Ardren et al. (in lit), provides new information regarding the evolutionary relationship of Foskett speckled dace to other Warner Basin and Goose Lake Basin speckled dace (See section 2.3.1.3).

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

The known range of the Foskett speckled dace is limited to Foskett Spring in the Coleman Subbasin, in southeast Oregon. At the time of listing, Foskett speckled dace was restricted to Foskett Spring and a transplanted population at nearby Dace Spring. No Foskett speckled dace have been observed in Dace Spring since 19 individuals were observed in 1997 (See section 2.3.1.2). Surveys of Foskett Spring conducted in 2005 and 2007 document Foskett speckled dace in the spring pool, outflow stream, and the tule and cattail marshes of Foskett Spring. The Recovery Plan describes Foskett Spring as originating in a pool about 5 meters across. The outflow channel is approximately 5 centimeters deep and it gradually transitions to marshland, drying up before reaching the dry bed of Coleman Lake. The ODFW estimated approximately 722 m^2 of wetted habitat in the spring pool, spring brook, tule marsh, cattail marsh, and sedge marsh (Scheerer and Jacobs 2005). In 2005 and 2007, approximately half of the population of Foskett speckled dace was located in the 33 m^2 spring pool.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

In 2005 and 2007, the ODFW considered the Foskett speckled dace habitat to be in good condition, but limited in extent (Scheerer and Jacobs 2005 and 2007). They noted that encroachment by aquatic macrophytes may be limiting population abundance and that the decline in abundance of Foskett speckled dace since 1997 is probably due to the reduction in open water habitat. Dambacher et al. (1997) noted that past habitat enhancement efforts to increase open water habitat have been unsuccessful due to sediment infilling and growth of macrophytes. Little information is available on water quality or flows. See section 2.3.1.5 above for amount of available habitat.

2.3.1.7 Other:

The State of Oregon enacted an Endangered Species Act (Oregon ESA) in 1987 and amended it in 1995. The Foskett speckled dace was listed as threatened as part of the original enactment of the Oregon ESA in 1987. See section 2.3.2.4 for a description of the Oregon ESA.

In 2002, the Oregon Fish and Wildlife Commission adopted the native Fish Conservation Policy. The purpose of the policy is to ensure conservation and recovery of native fish in Oregon. As part of this policy, interim risk assessments were completed for selected native fish species, including the Foskett speckled dace (ODFW 2005a). The ODFW concluded, based on criteria defined in the Native Fish Conservation Policy" [OAR 635-007-0507], that the Foskett speckled dace is "at risk". The rating is based on low abundance of individuals; lack of information on productivity; and limited distribution. Foskett speckled dace was not considered at risk for reproductive independence and interspecific hybridization. The status review stated that: "Because of its highly restricted distribution, dependence on a single water source, and loss of habitat area from sedimentation and growth of aquatic macrophytes, Foskett speckled dace is vulnerable to catastrophic loss." Implementation of the policy will occur through the development of a conservation plan which will include current and desired biological status, primary threat factors, short- and long-term management strategies, monitoring and research needs, and reporting. A conservation plan has not been initiated for the Foskett speckled dace. Until a conservation plan is completed, the ODFW will manage this species according to existing statutes and administrative rules.

In 2006, the ODFW finalized their Oregon Conservation Strategy (Strategy) (ODFW 2005b). The Strategy is an overarching State-wide approach for conserving fish and wildlife through the use of voluntary measures and collaboration. The Foskett speckled dace is a "strategy species" for the Northern Basin and Range Ecoregion in southeast Oregon. Strategy species include rare, and at risk species. The Strategy identifies species requirements, limiting factors, data gaps, and actions needed to conserve these species. For the Foskett speckled dace, the Strategy states that it is vulnerable to random or localized disturbance, habitat has been affected by past agricultural practices, and data gaps include genetics, population dynamics, and long-term habitat needs. According to the Strategy, priority actions identified to conserve Foskett speckled dace include secure spring waters for habitat and maintain connectivity of habitat.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

The original listing of 1985 stated that due to the very restricted distribution of the Foskett speckled dace and the vulnerability of the habitat due to its small size and a water flow rate less than 0.5 cubic feet per second (cfs), threats to the Foskett speckled dace include: pumping of ground water and lowering of the water table; mechanical modification of the aquatic ecosystem; and livestock watering uses (50 FR 12303).

Since the time of listing, BLM acquired the property containing Foskett and Dace Spring by land exchange in 1987. A fence was erected to protect the habitat at the spring and outflow from cattle grazing. However, the entire occupied habitat was not included in the fenced area. In 1997, 97 percent of the total population estimate of Foskett speckled dace occurred in a shallow open water pool outside of the Foskett Spring exclosure fence. In 2007, 422 Foskett speckled dace were estimated to occur within outflow habitat outside of the exclusion fence (Scheerer and Jacobs 2007). Trampling of outflow habitat was evident. Exclusion of cattle improves water quality, but use by cattle may have played a role in maintaining open water habitat. The additional nutrients associated with livestock use may in turn stimulate the growth of aquatic vegetation.

The field surveys conducted in 2005 and 2007, did not reveal any sign of artificial channeling of water or mechanized impacts beyond the remnants of the historical activities (two small dams and sidecasting of material around the spring). The habitat at Foskett Spring is limited in extent, and encroachment by aquatic macrophytes is reducing the area of open water. The decline in abundance of Foskett speckled dace since 1997 is probably due to the reduction in open water habitat (Scheerer and Jacobs 2005) (see section 2.3.1.2 and 2.3.1.6). Past habitat enhancement efforts to increase open water habitat have been unsuccessful due to sediment infilling and growth of macrophytes. The ODFW advised that restoration efforts to increase open water habitat be considered to increase carrying capacity.

Little information is available regarding stream flows or the status of the aquifer. There are no records of established water rights on the land area where the springs occur. Any filing of water rights would have to apply for a right-of-way from the BLM (Alan Munhall pers. comm. 2007).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

The original listing of 1985 stated: "There is no indication that the Hutton tui chub or Foskett speckle dace are overutilized for any of these purposes." No information is available to change this statement.

2.3.2.3 Disease or predation:

The original listing of 1985 stated: "There are no known threats to the Hutton tui chub or Foskett speckle dace from disease or predation." No information is available to change this statement. During the 2005 population surveys conducted, the ODFW biologist noted that: "[t]he fish appear to be in good condition with no obvious external parasites" (Scheerer and Jacobs 2005).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

The 1985 listing rule stated: "The State of Oregon lists both the Hutton tui chub and Foskett speckled dace as "fully protected subspecies" under the Oregon Department of Fish and Wildlife regulations. These regulations prohibit taking of the fishes without an Oregon scientific colleting permit. However, no protection of the habitat is included in such a designation and no management or recovery plan exists for these subspecies."

The original listing was apparently referring to Oregon angling regulations that designated Foskett speckled dace as a "protected species" and prohibited take or possession unless authorized by a permit. The Foskett speckled dace was listed as Threatened by the State of Oregon as part of the original enactment of the Oregon ESA in 1987. The Oregon ESA prohibits the "take" (kill or obtain possession or control) of listed species without an incidental take permit. The Oregon ESA applies to actions of State agencies on State-owned or leased land, and does not impose any additional restrictions on the use of Federal land. Under the Oregon ESA, State agencies (other than State land owning or managing agencies) determine the role the may serve in contributing toward conservation or take avoidance (OAR 635-100-0150). The Oregon ESA also directs that Survival Guidelines (OAR 635-100-0130 and 0135) or an approved endangered species management plan (OAR 635-100-0140) be prepared. Because the Foskett speckled dace was State listed prior to these 1995 amendments these requirements do not apply to this species. The Oregon ESA regulates the "take" of Foskett speckled dace, but does not directly regulate or restrict activities that affect Foskett speckled dace habitat, because it is located on Federal land.

The State of Oregon's Native Fish Conservation Policy calls for conservation and recovery of native fish in Oregon. As described in section 2.3.1.7 above, the policy will be implemented through the development of collaborative conservation plans for individual species management units, and will be adopted by the Oregon Fish and Wildlife Commission. The ODFW conducted an interim risk assessment using the interim criteria and concluded that the Foskett speckled dace is "at risk". "At risk" status provides for an elevated priority for monitoring and development of the conservation plan, and modifications to fish management practices within the ODFW statutory authority. The Native Fish Conservation Policy does not provide regulatory protection for Foskett speckled dace or its habitat. No conservation planning effort for Foskett speckled dace has been initiated. As a result of coordination on this 5-year review, the ODFW has indicated that they are interested in working with the Service and other partners on a conservation plan for Foskett speckled dace.

In 1987, BLM acquired the 65 hectare parcel of land containing Foskett and Dace Spring by land exchange. The BLM manages the site consistent with the Lakeview RMP. The Lakeview RMP provides general management direction for Special Status Species, and states that they will manage the Foskett speckled dace consistent with the Recovery Plan.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

The original listing of 1985 stated: "Additional threats include the possible introduction of exotic fishes into the springs, which could have disastrous effects on the endemic Hutton tui chub and Foskett speckled dace, either through competitive exclusion, predation, or introduced disease. Because these fishes occur in such limited and remote areas, vandalism also poses a potential threat."

No known occurrence of exotic fish introduction or of vandalism has occurred since the time of listing. The Foskett speckled dace is vulnerable to invasive or nonnative species (aquatic plants, invertebrates, or fish species). This vulnerability is reduced in part due to the remoteness of the site and the lack of any recreational or other reasons for the public to visit the area. However, the presence of non-native invasive species in Oregon has increased, and the probability for introduction increases as more people visit the remote areas of Oregon. The risk of such invasions occurring through human caused mechanism may be low, but the potential magnitude of the impact is great due to the highly restricted distribution of this species. No Federal, State, management plan or monitoring program is in place to manage or monitor the species or its habit for invasive species. No contingency plan is in place should invasive species or other catastrophic event occur.

Risk Factors

A species' habitat requirements, population size, and dispersal abilities among other factors, help to determine its vulnerability to extinction. Key risk factors include small population size, dependence upon a rare habitat type, inability to move away from sources of stress or habitat degradation, restrictions to a small geographic area, and vulnerability to catastrophic loss resulting from random or localized disturbance (Williams et al. 2005). These factors all apply to the Foskett speckled dace.

Small population size. Available open water habitat appears to be a key factor in the population size of this species. In 1997, the population was estimated to be 27,787 with ninety-seven percent of the total population in a shallow ephemeral open water pool outside the fenced exclosure and subject to cattle watering and grazing. This pool was dry in 1989. The 2005 population estimate was 3,147 fish. Over half of the population occurred in the spring pool, and the investigators noted that the site was near carrying capacity, and that encroachment by aquatic macrophytes may be limiting the population abundance. Surveys by ODFW in 2007, documented 2,984 fish. More data is needed to track fluctuations in abundance and determine population trends. In 2005, the ODFW recommended that restoration efforts to increase open water habitat be considered to increase carrying capacity. There is an ongoing effort with the BLM, ODFW, and Service to implement a pond creation and restoration of the Dace Spring as a refugial habitat for Foskett speckled dace. Once the ponds have been created and

stabilized, the Foskett speckled dace transfer will be evaluated and implemented. No Federal or State management plan has been prepared to manage and monitor the species or its habitat.

Dependence upon a specific rare habitat type and inability to disperse. This species is presently only known to occur within Foskett Spring. Due to the small size of Foskett Spring and the lack of connectivity to other aquatic habitat, there is no ability for the Foskett speckled dace to disperse away from stress, habitat degradation, or disturbance factors. There are no streams or drainages or other aquatic connections that provide alternate habitat or allow for emigration. Efforts to transplant this species to Dace Spring failed (See section 2.3.1.2). The 2005 ODFW Progress Report identified the restoration of Dace Springs and introduction of Foskett speckled dace as steps that could reduce the risk of extinction and aid in recovery. There is an ongoing effort by the Service, BLM, and ODFW to restore Dace Springs and transplant Foskett speckled dace.

Restriction to a small geographic area and vulnerability to stochastic events. The Foskett speckled dace occurs on one small location in Foskett Spring. The available open water habitat at Foskett Spring is limited and suitable habitat appears to be reduced in area due to encroachment by macophytic aquatic vegetation. Because of its highly restricted distribution and dependence on a single water source, Foskett speckled dace are vulnerable to catastrophic loss. No State or BLM management plan exists for Foskett Spring or the Foskett speckled dace. No contingency plan exists in the event of a catastrophic disturbance, and regular monitoring conducted every 2 to 3 years, is an ongoing effort to identify such disturbances.

2.4 Synthesis

The Foskett speckled dace was listed as threatened in 1985 because it has an extremely restricted distribution, occurred in low numbers, and inhabits a single small spring that was susceptible to destruction and modification, and was experiencing human disturbance. Some of the initial factors that were directly degrading Foskett Spring such as mechanical modification of the aquatic ecosystem are not known to have occurred since this species was listed as Threatened under the Federal Endangered Species Act.

The 1998 Recovery Plan recognized the vulnerability of the Foskett speckled dace based on its extremely small and isolated range and the potential for degradation of its habitat from localized events. The Recovery Plan stressed the need to address the threat to this species by preservation of its native ecosystem through long-term protection and management informed by research. To date, only partial implementation of the three Recovery Plan criteria has occurred: (1) Long-term protection of habitat has occurred through the acquisition and fencing of both Foskett and Dace Springs by the BLM. Status of the aquifer is unknown; (2) Long-term management guidelines have not been developed and implemented. The Service, ODFW and BLM have only been able to do minimal sporadic monitoring every 2 to 3 years; and (3) Limited research has been conducted on the population and genetics. Additionally, virtually no information exists

on life history, habitat use and preference, and demographic information regarding population trends, age structure, sex ratio, age at reproduction, growth rate, age at mortality, mortality rate, or behavioral patterns of the Foskett speckled dace.

The BLM and Service have begun an effort to implement restoration of Dace Spring in order to provide refugial habitat for a population expansion. Creation of two ponds with water control structures should provide habitat for Foskett speckled dace transferred from the Foskett Spring. Maintaining an additional habitat will provide stronger assurance against threats form stochastic events. The new population segment will be monitored to assure transferred fish persist and assess survival rates of transferred fish.

Our ability to confidently state that the Foskett speckled dace is not likely to become endangered in the foreseeable future is dependent upon addressing the risks related to its small population size, restricted distribution, the quality and quantity of its habitat, and the potential impact of a catastrophic stochastic event. Remaining habitat in Foskett Spring is being reduced in area by the encroachment of aquatic vegetation. The lower population abundance and altered species distribution is likely the result of less available habitat due to the reduction of open water. No management plan has been prepared to maintain open water habitat, and allow for population and habitat monitoring, nor is there a contingency plan to address a catastrophic event or the introduction of an invasive species.

Based on preliminary genetic information by Ardren (In litt.), a systematic assessment of morphological traits and life history of the speckled dace in Warner Basin (Deep, Honey, and Twelvemile Creeks, and Foskett Spring) is needed to determine whether or what subspecies classification is warranted. Until this assessment of the taxonomy of the Foskett speckled dace is completed, for the reasons stated above the Foskett speckled dace warrants the classification of threatened status.

3.0 RESULTS

3.1 Recommended Classification:

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__X__ **No change is needed**

3.2 New Recovery Priority Number: 15

Brief Rationale:

We recommend maintaining the recovery priority number at 15 which is a low risk with a high potential for recovery. Accomplishing recovery actions such as

improving habitat quality through removal of aquatic vegetation to create open water habitat at Foskett Spring, implementing the habitat restoration and fish transplant at Dace Spring, preparation and implementation of a joint habitat management plan with ODFW and BLM, and monitoring of the population and habitat quality and quantity are feasible and would provide significant recovery benefits for the Foskett speckled dace.

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: NA
Reclassification (from Endangered to Threatened) Priority Number: NA
Delisting (regardless of current classification) Priority Number: NA

Brief Rationale:

Not applicable

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

1. Conduct a systematic assessment of morphological traits and life history of the speckled dace in Warner Basin (Deep, Honey, and Twelvemile Creeks, and Foskett Spring) to determine whether or what subspecies classification is warranted.

2. Work with BLM and ODFW to assess encroachment by aquatic vegetation at Foskett Spring. Develop a restoration plan and regular maintenance schedule to increase and maintain suitable open water habitat for Foskett speckled dace.

3. Work with BLM and ODFW to develop a long-term management and monitoring plan. Develop a Memorandum of Agreement for collaborative implementation of the management and monitoring plan. Monitoring should include both the fish population and spring habitat. Monitoring should be sufficient to track fluctuations in fish abundance, quantity and quality of available habitat, and presence of any nonnative or invasive aquatic plant, invertebrate, or fish species. Population estimates and habitat conditions should be monitored at least every three years. Surveys every three years would limit injury or mortality due to handling while providing information on multiple age classes of fish, and population trends.

4. Work with ODFW and BLM to complete the restoration of Dace Spring including maintenance and monitoring requirements, and the Foskett speckled dace transplant effort.

5. Collect key life history information, including population age structure, age and size at maturity, longevity, and spawning timing and duration.

6. Assess whether the fence surrounding Foskett and Dace Springs is in need of repairs or reconstruction to ensure that livestock do not access the spring. Assess whether the fence should be expanded to include all occupied and suitable habitat.

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Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Foskett Speckled Dace (*Rhinichthys osculus ssp.*)

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__X__ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: 15

Review Conducted By: Alan Mauer

_____ Date 3/25/09
Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date _____
Lead Regional Director, Fish and Wildlife Service

_____ Date _____
Cooperating Regional Director, Fish and Wildlife Service
_____Concur _____ Do Not Concur